FIG. 1

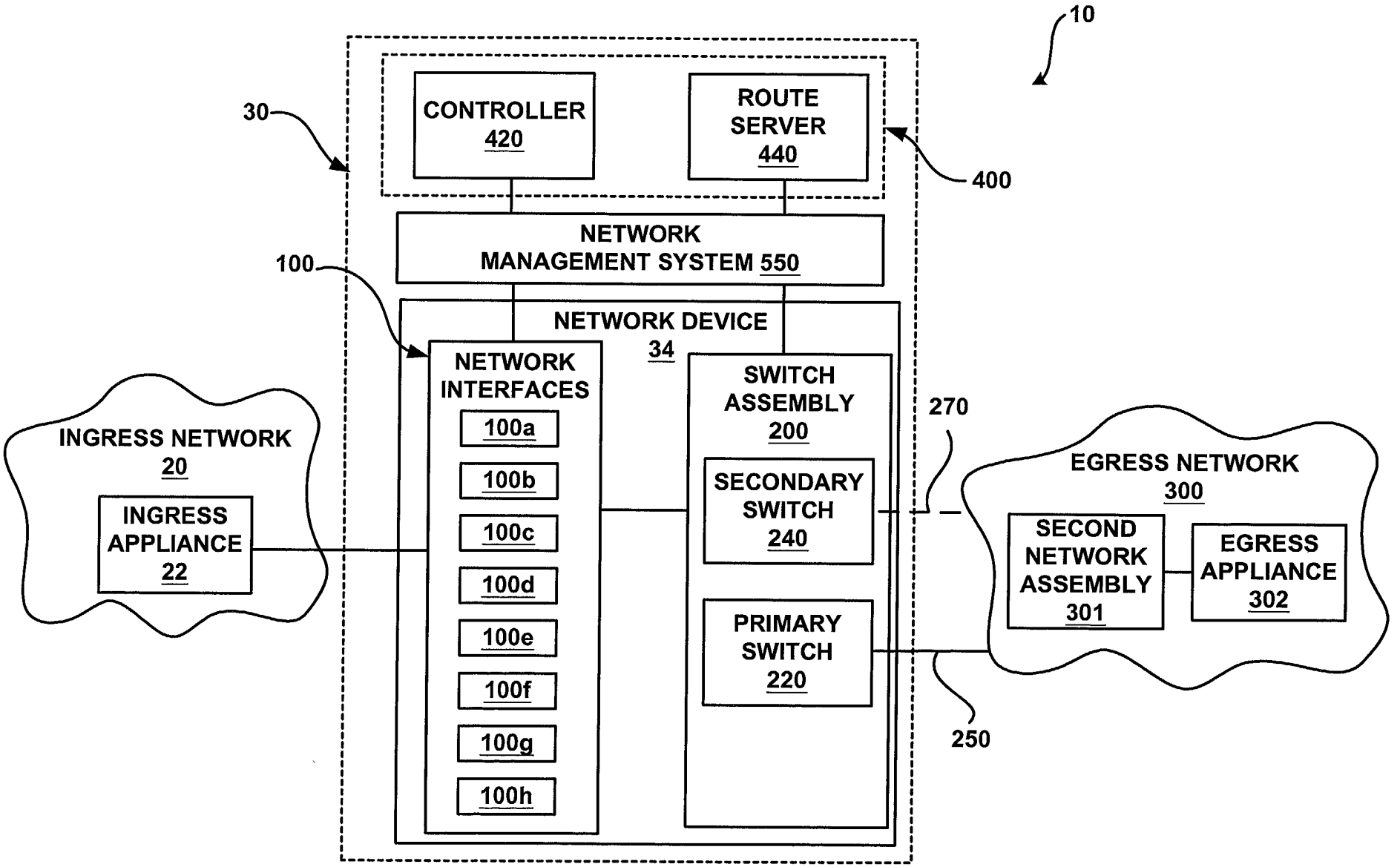

10
30
CONTROLLER 420
ROUTE SERVER 440
400
NETWORK MANAGEMENT SYSTEM 550
100
NETWORK DEVICE 34
NETWORK INTERFACES
100a
100b
100c
100d
100e
100f
100g
100h
SWITCH ASSEMBLY 200
SECONDARY SWITCH 240
PRIMARY SWITCH 220
270
250
INGRESS NETWORK 20
INGRESS APPLIANCE 22
EGRESS NETWORK 300
SECOND NETWORK ASSEMBLY 301
EGRESS APPLIANCE 302

FIG. 2

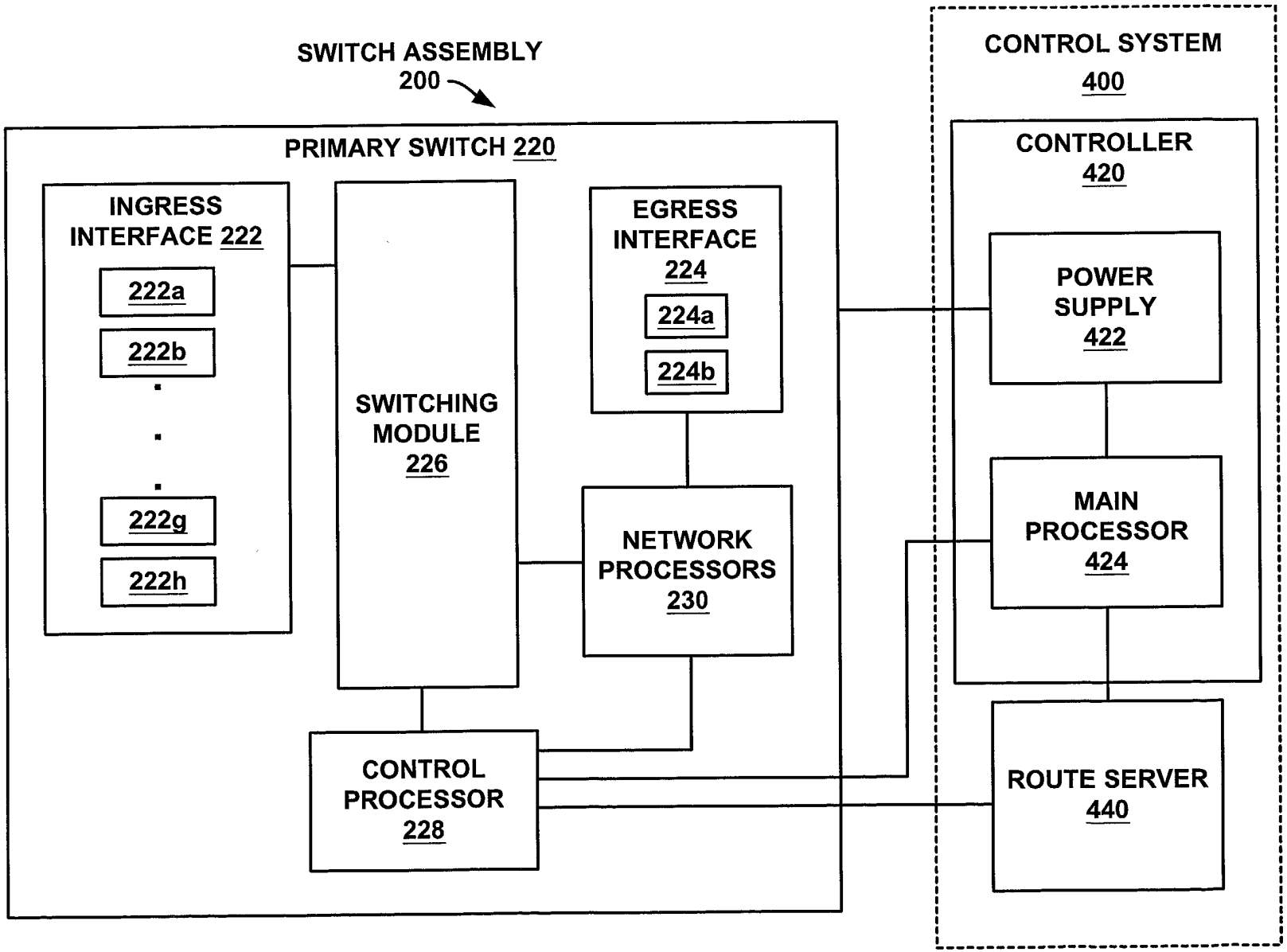

SWITCH ASSEMBLY
200
PRIMARY SWITCH 220
INGRESS INTERFACE 222
222a
222b
222g
222h
SWITCHING MODULE 226
EGRESS INTERFACE 224
224a
224b
NETWORK PROCESSORS 230
CONTROL PROCESSOR 228
CONTROL SYSTEM 400
CONTROLLER 420
POWER SUPPLY 422
MAIN PROCESSOR 424
ROUTE SERVER 440

FIG. 3

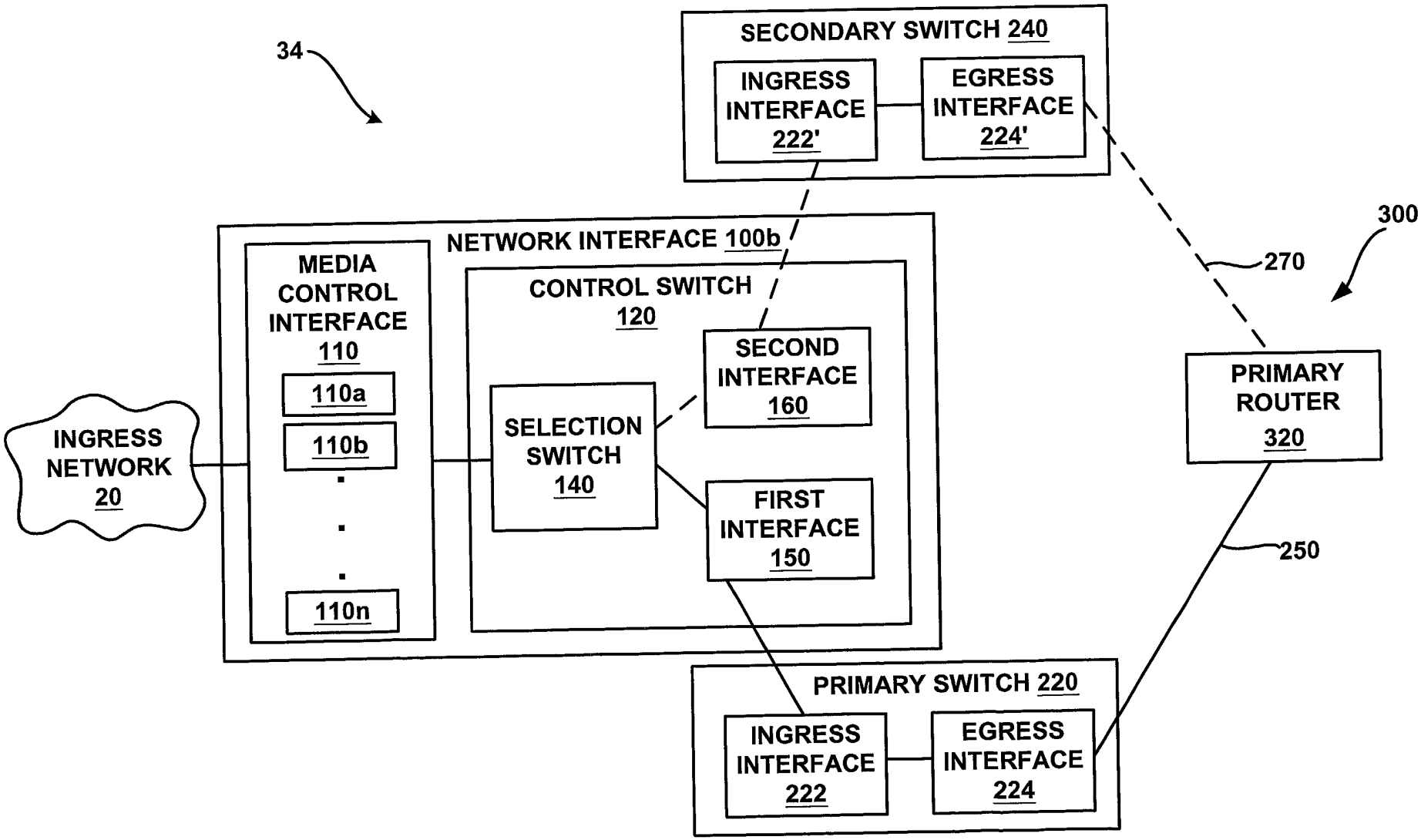

34
SECONDARY SWITCH 240
INGRESS INTERFACE 222'
EGRESS INTERFACE 224'
300
270
NETWORK INTERFACE 100b
MEDIA CONTROL INTERFACE 110
110a
110b
110n
CONTROL SWITCH 120
SECOND INTERFACE 160
SELECTION SWITCH 140
FIRST INTERFACE 150
INGRESS NETWORK 20
PRIMARY ROUTER 320
250
PRIMARY SWITCH 220
INGRESS INTERFACE 222
EGRESS INTERFACE 224

FIG. 4

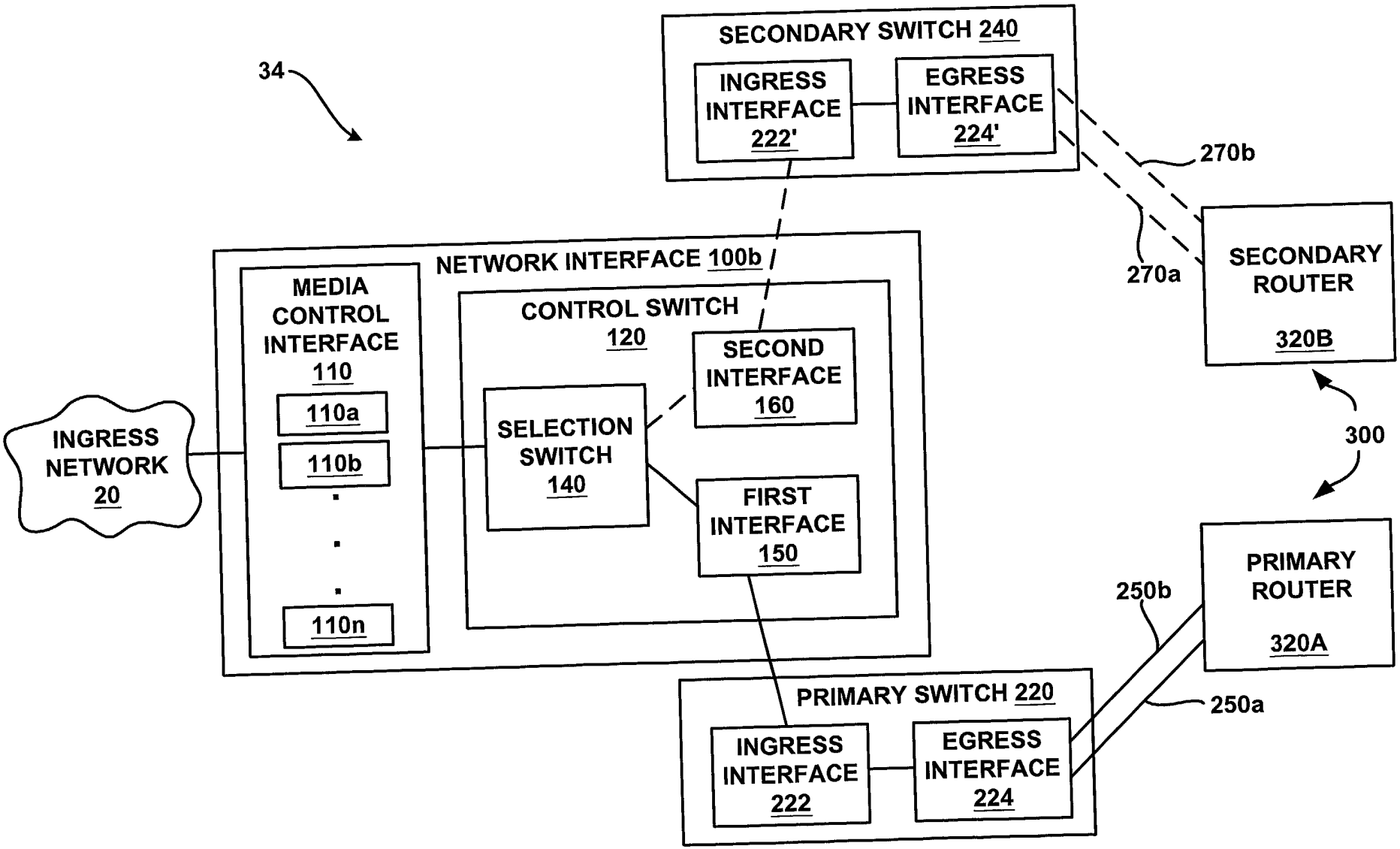

34
SECONDARY SWITCH 240
INGRESS INTERFACE 222'
EGRESS INTERFACE 224'
270b
270a
SECONDARY ROUTER 320B
NETWORK INTERFACE 100b
MEDIA CONTROL INTERFACE 110
110a
110b
110n
CONTROL SWITCH 120
SECOND INTERFACE 160
SELECTION SWITCH 140
FIRST INTERFACE 150
INGRESS NETWORK 20
300
PRIMARY ROUTER 320A
250b
250a
PRIMARY SWITCH 220
INGRESS INTERFACE 222
EGRESS INTERFACE 224

FIG. 5a

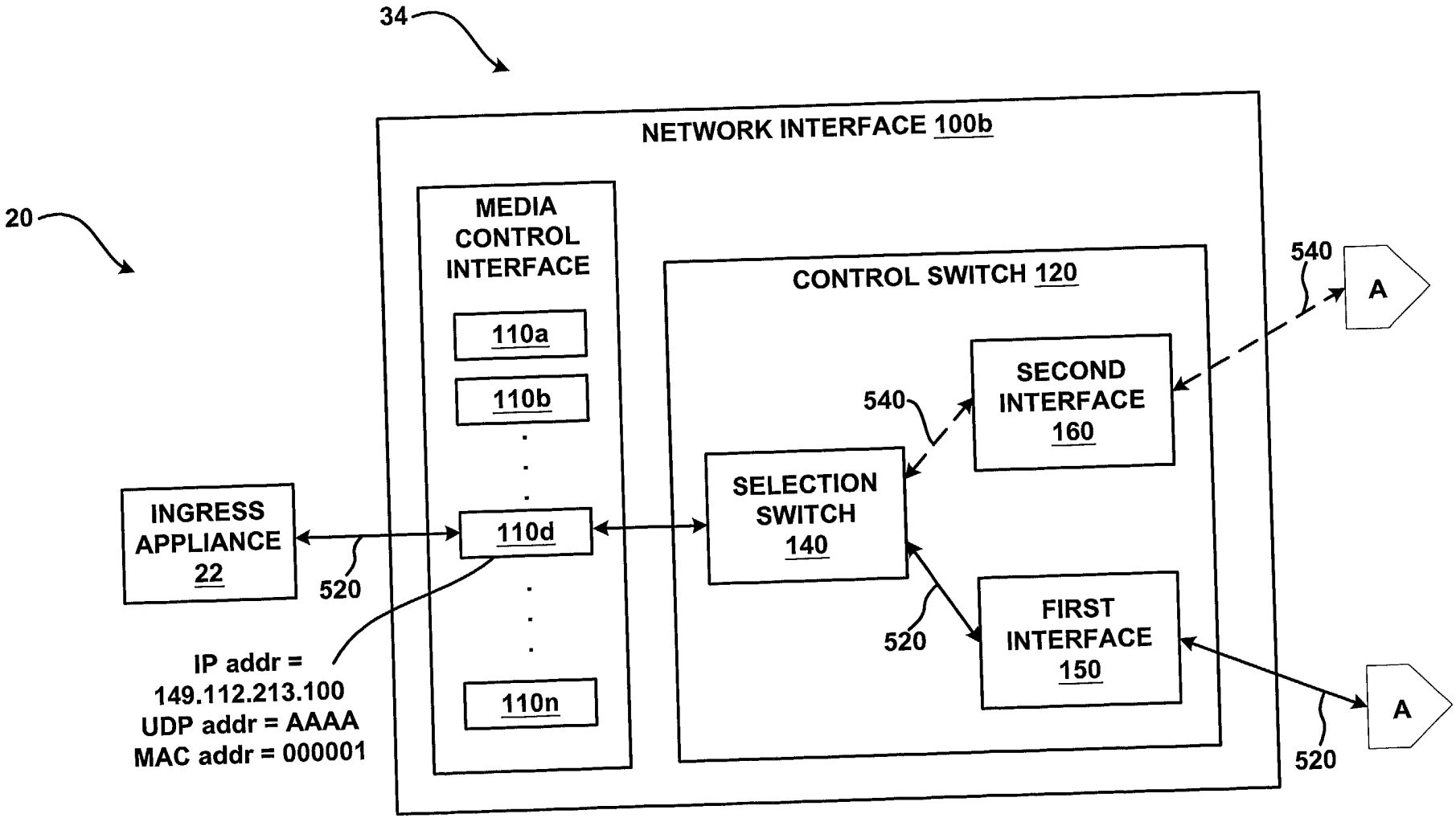

34
20
NETWORK INTERFACE 100b
MEDIA CONTROL INTERFACE
110a
110b
110d
110n
CONTROL SWITCH 120
SECOND INTERFACE 160
SELECTION SWITCH 140
FIRST INTERFACE 150
INGRESS APPLIANCE 22
520
540
A
IP addr = 149.112.213.100
UDP addr = AAAA
MAC addr = 000001

FIG. 5a (cont.)

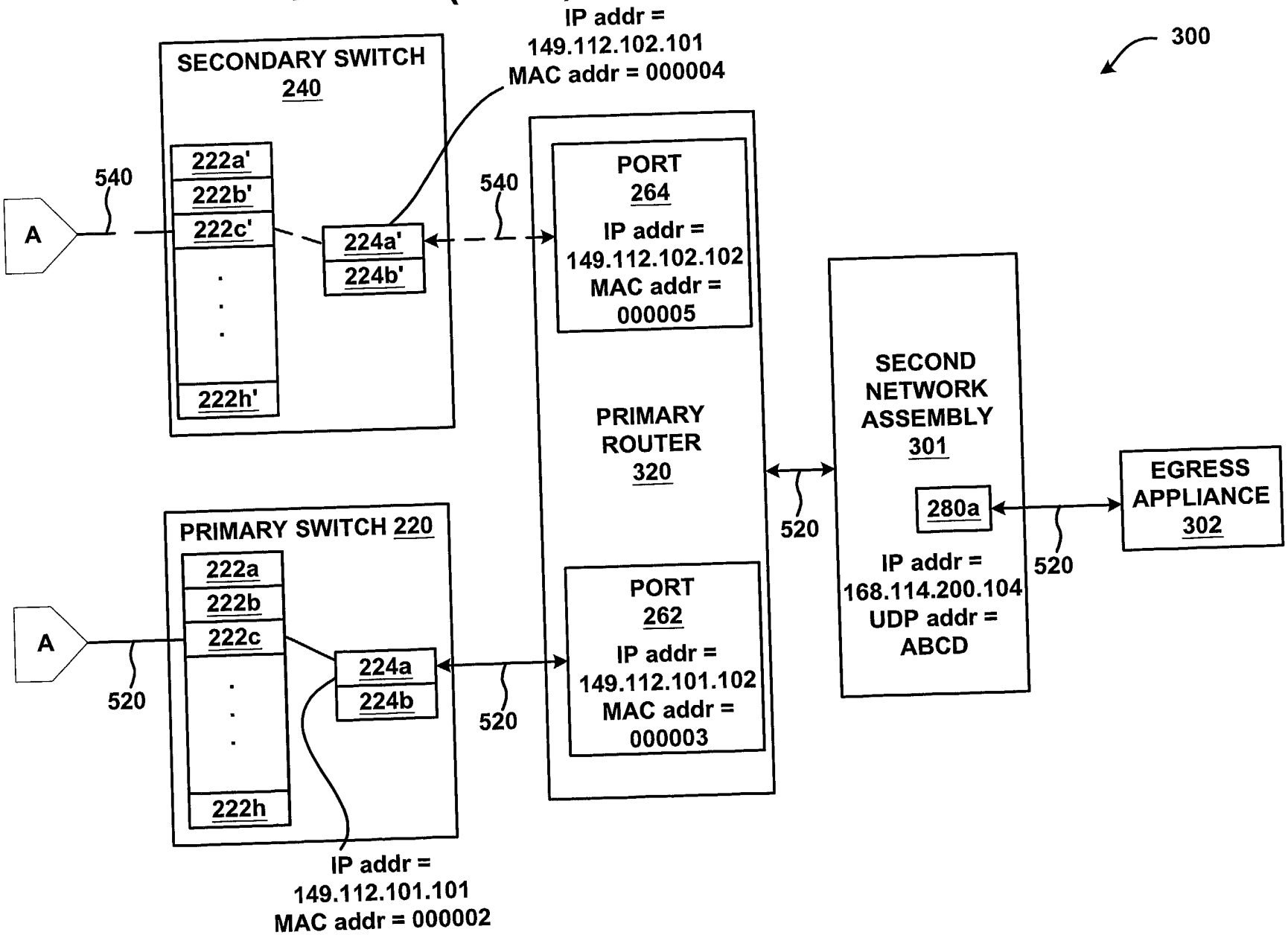

300
SECONDARY SWITCH
240
IP addr =
149.112.102.101
MAC addr = 000004
222a'
222b'
222c'
222h'
224a'
224b'
540
540
A
PORT
264
IP addr =
149.112.102.102
MAC addr =
000005
PRIMARY
ROUTER
320
SECOND
NETWORK
ASSEMBLY
301
280a
EGRESS
APPLIANCE
302
520
520
IP addr =
168.114.200.104
UDP addr =
ABCD
PRIMARY SWITCH 220
222a
222b
222c
222h
224a
224b
A
520
520
PORT
262
IP addr =
149.112.101.102
MAC addr =
000003
IP addr =
149.112.101.101
MAC addr = 000002

FIG. 5b

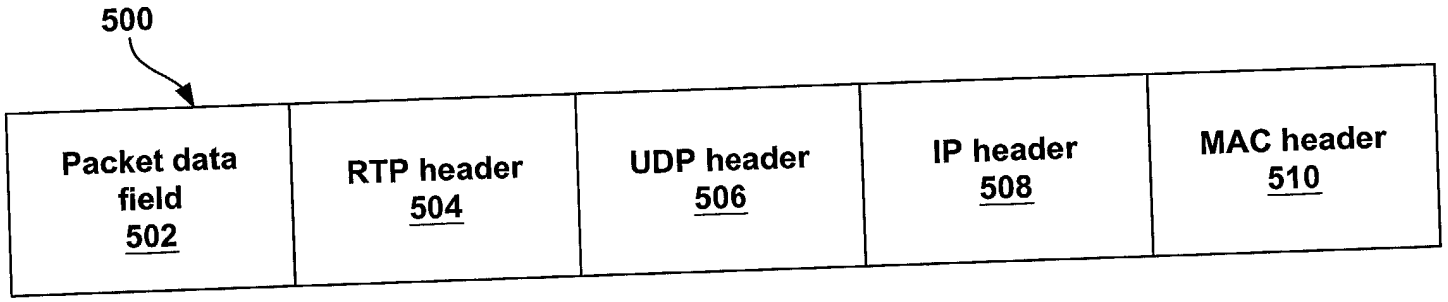

500
Packet data field 502
RTP header 504
UDP header 506
IP header 508
MAC header 510

FIG. 5c

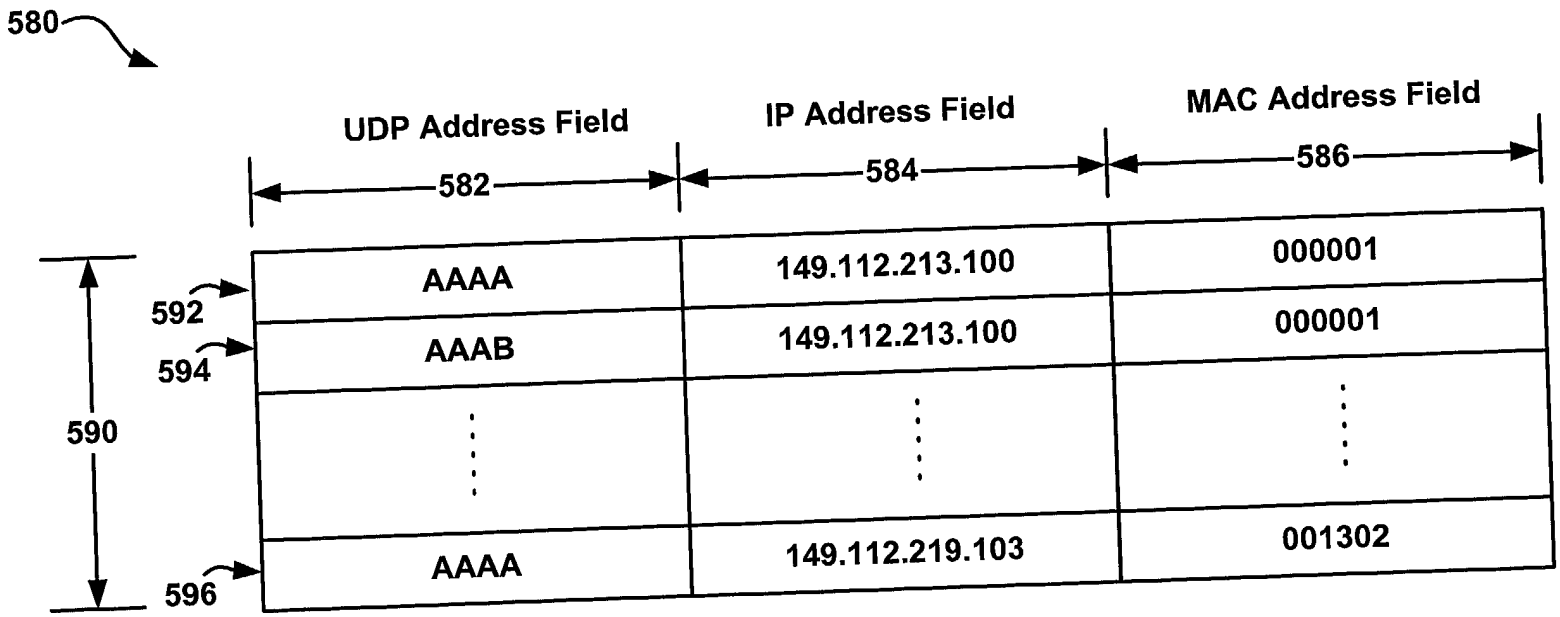

580
UDP Address Field
582
IP Address Field
584
MAC Address Field
586
590
592
AAAA
149.112.213.100
000001
594
AAAB
149.112.213.100
000001
596
AAAA
149.112.219.103
001302

FIG. 6a

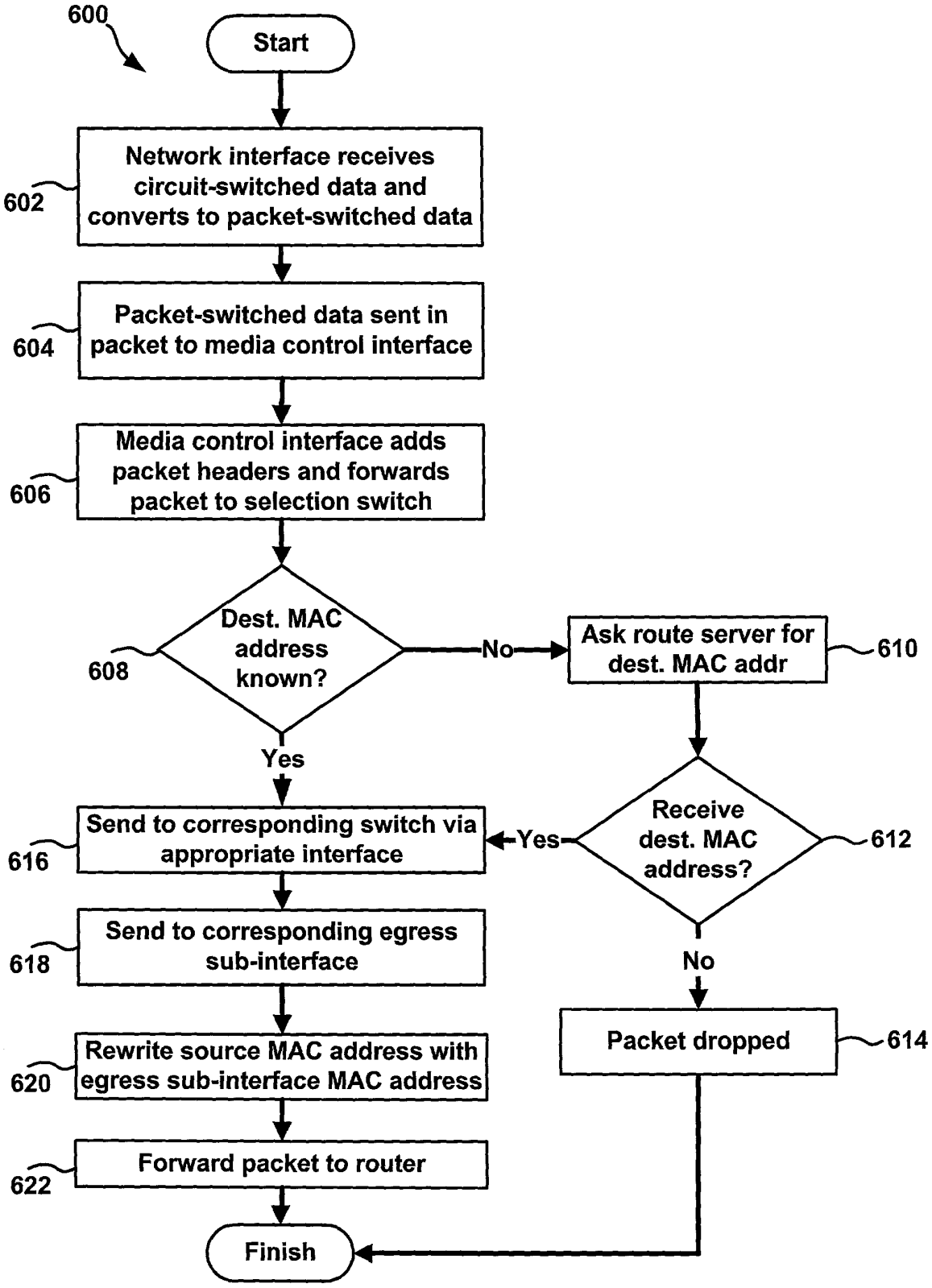

600
Start
Network interface receives circuit-switched data and converts to packet-switched data
602
Packet-switched data sent in packet to media control interface
604
Media control interface adds packet headers and forwards packet to selection switch
606
Dest. MAC address known?
608
No
Ask route server for dest. MAC addr
610
Yes
Receive dest. MAC address?
612
Yes
Send to corresponding switch via appropriate interface
616
No
Packet dropped
614
Send to corresponding egress sub-interface
618
Rewrite source MAC address with egress sub-interface MAC address
620
Forward packet to router
622
Finish

FIG. 6b

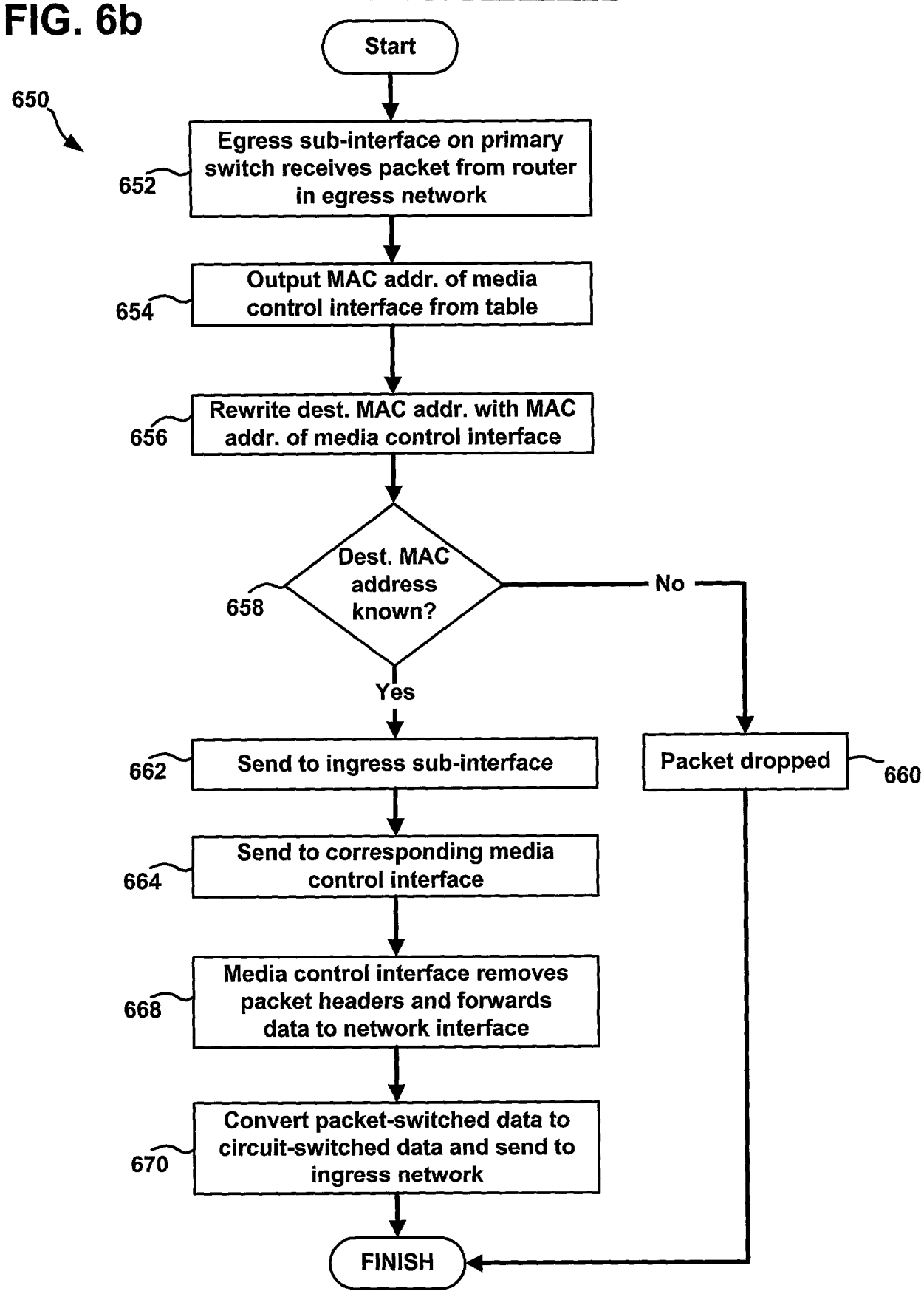

Start
650
Egress sub-interface on primary switch receives packet from router in egress network
652
Output MAC addr. of media control interface from table
654
Rewrite dest. MAC addr. with MAC addr. of media control interface
656
Dest. MAC address known?
658
No
Yes
Send to ingress sub-interface
662
Packet dropped
660
Send to corresponding media control interface
664
Media control interface removes packet headers and forwards data to network interface
668
Convert packet-switched data to circuit-switched data and send to ingress network
670
FINISH

FIG. 7

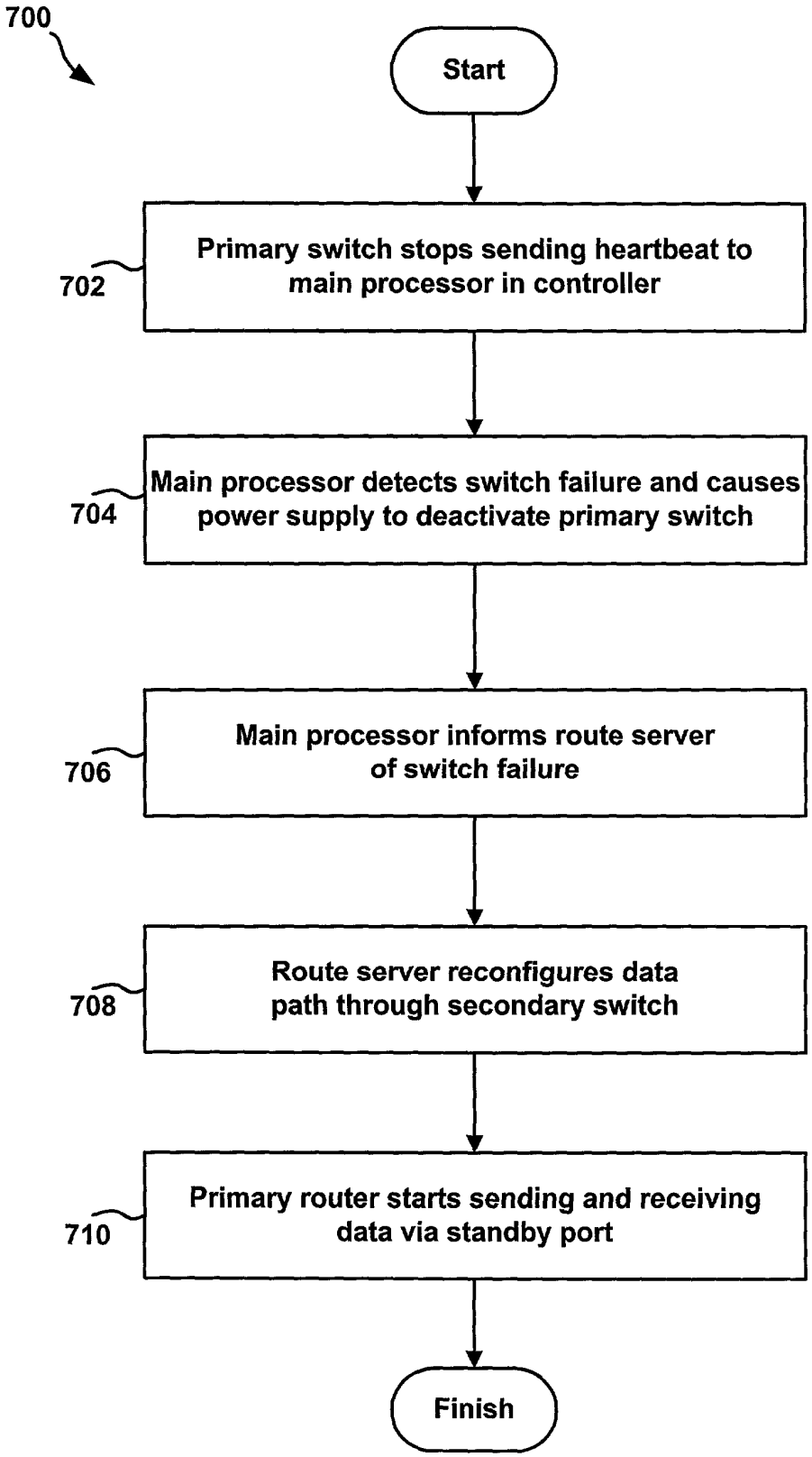

700
Start
Primary switch stops sending heartbeat to main processor in controller
702
Main processor detects switch failure and causes power supply to deactivate primary switch
704
Main processor informs route server of switch failure
706
Route server reconfigures data path through secondary switch
708
Primary router starts sending and receiving data via standby port
710
Finish

FIG. 8

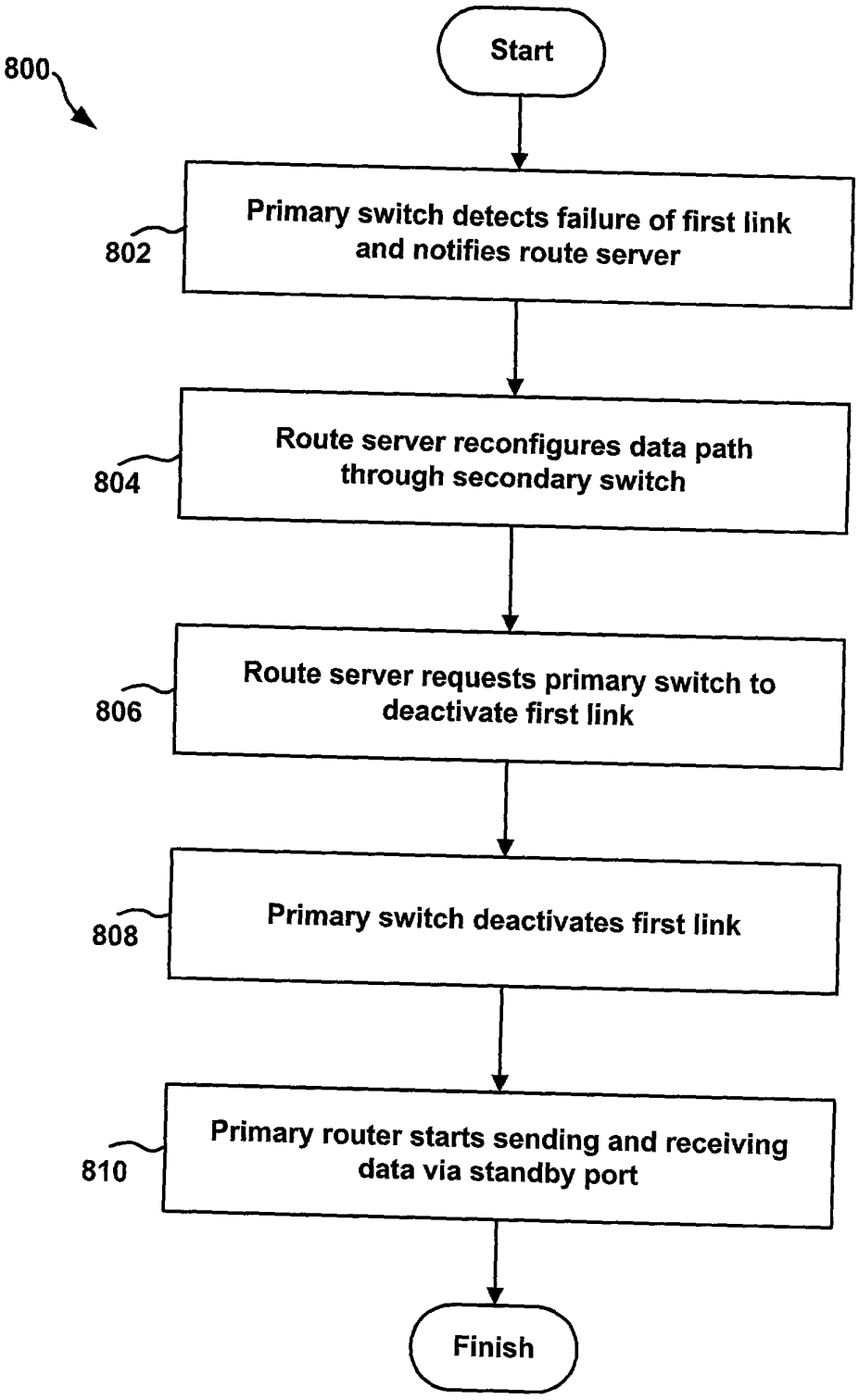

800
Start
802
Primary switch detects failure of first link and notifies route server
804
Route server reconfigures data path through secondary switch
806
Route server requests primary switch to deactivate first link
808
Primary switch deactivates first link
810
Primary router starts sending and receiving data via standby port
Finish

FIG. 9

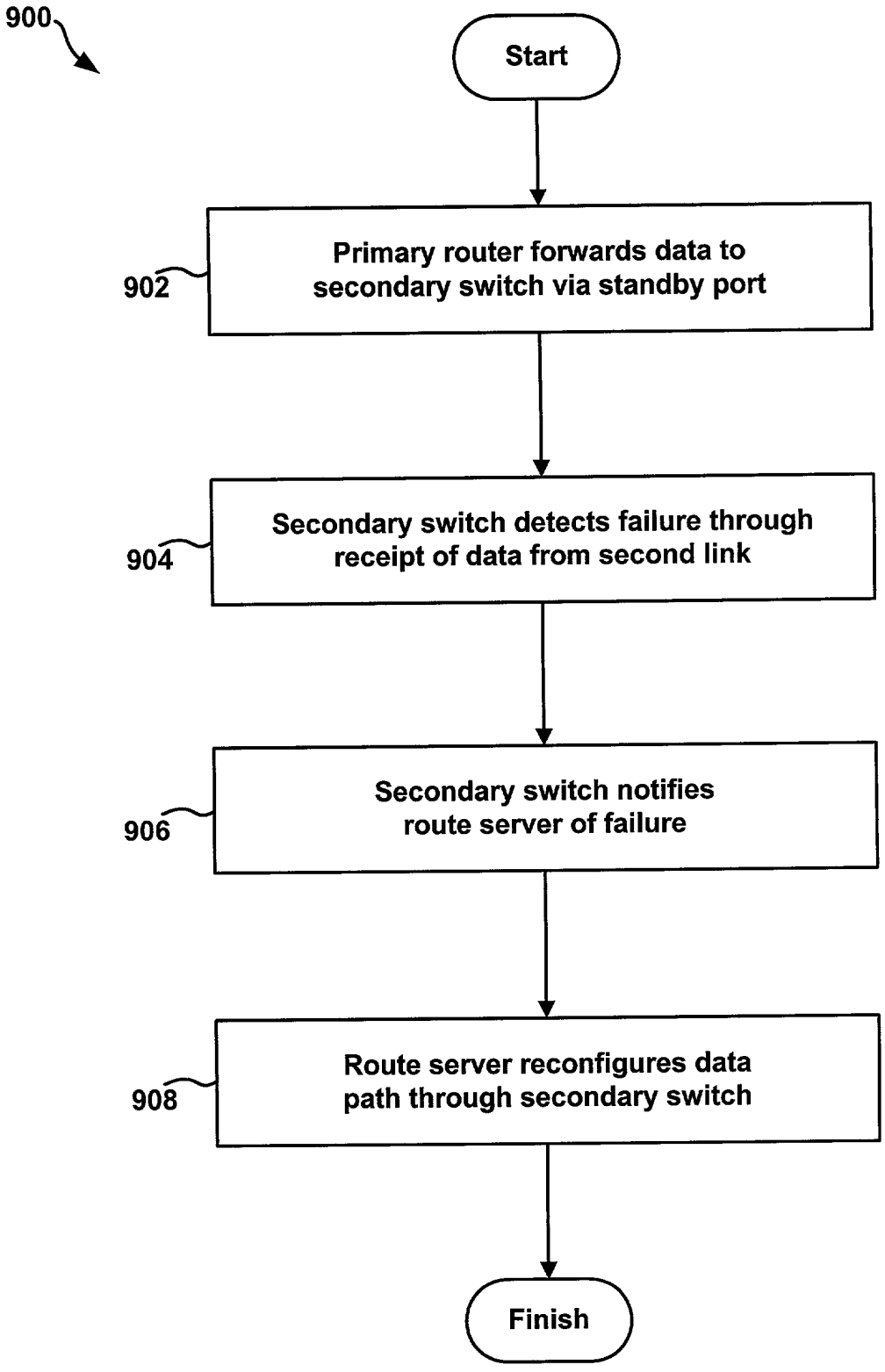
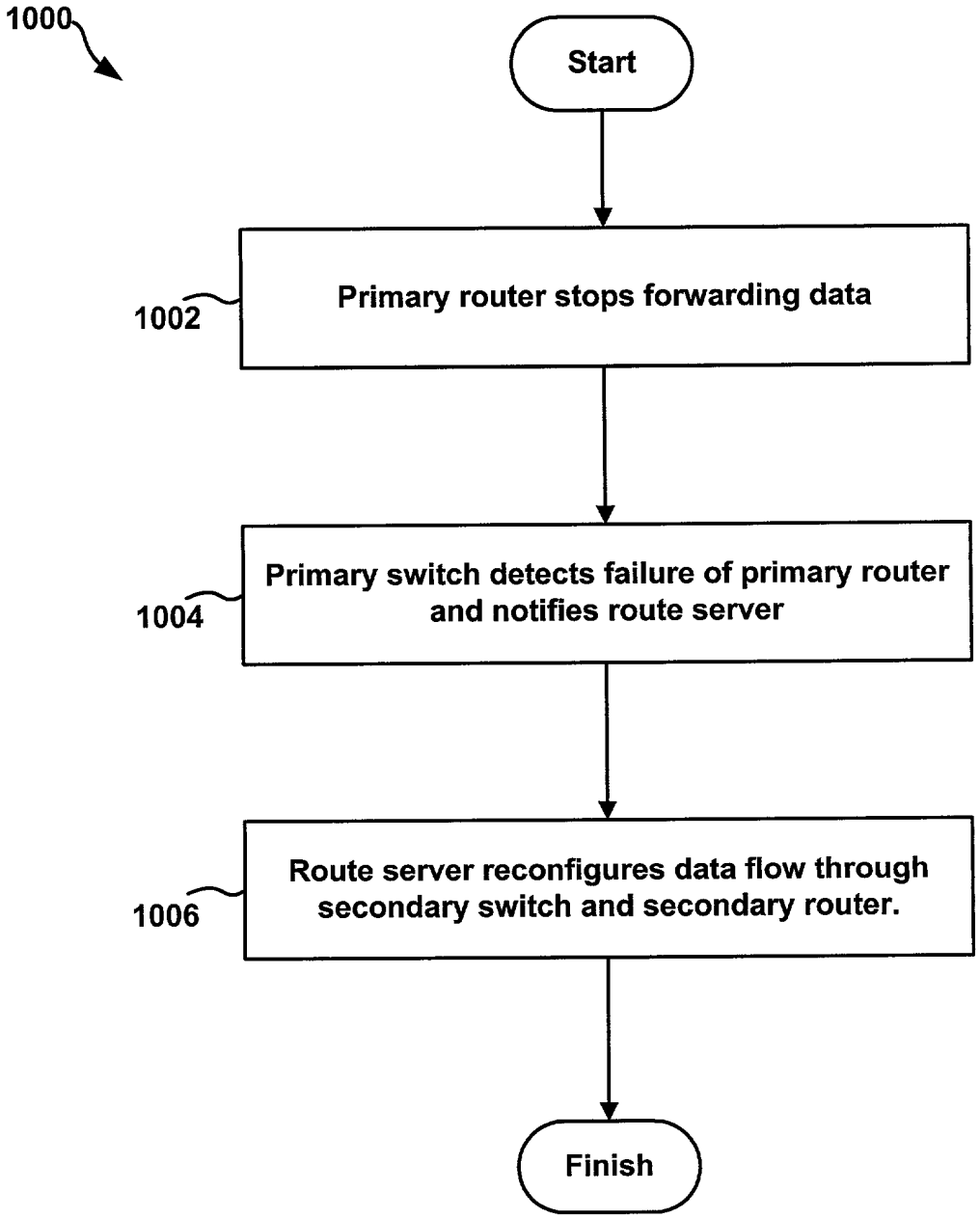

900
Start
902
Primary router forwards data to secondary switch via standby port
904
Secondary switch detects failure through receipt of data from second link
906
Secondary switch notifies route server of failure
908
Route server reconfigures data path through secondary switch
Finish

FIG. 10


1000
Start
1002
Primary router stops forwarding data
1004
Primary switch detects failure of primary router and notifies route server
1006
Route server reconfigures data flow through secondary switch and secondary router.
Finish